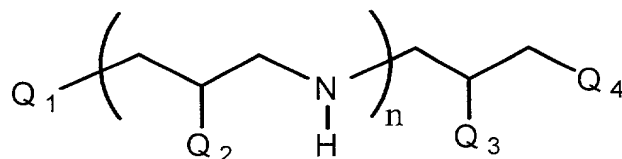


WHAT IS CLAIMED IS:

1. A compound having a general structure represented by formula:



wherein:

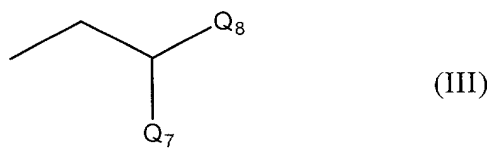
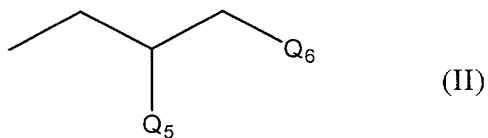
5 n is 0 or a positive integer;

Q_1 is $N(R)_3^+$, $N(R)_2$, $O(R)$, or $O(R)_2^+$ wherein each R substituent is independently selected from the group consisting of H , a straight chain or branched alkyl or alkenyl, a straight chain or branched alkyl or alkenyl ether, a straight chain or branched alkyl or alkenyl ester and a straight chain or branched alkyl or alkenyl carbonyldioxide with the proviso that at least one R substituent on the O or N atom of Q_1 is not H ;

Q_3 , and each Q_2 are independently selected from the group consisting of H , $O(R')$, $N(R')_2$, $NH(R'')$, and $S(R')$; and

Q_4 is selected from the group consisting of $N(R')_2$ and $NH(R'')$; wherein:

15 R' is H or one the following moieties:



and wherein each of Q_5 , Q_6 , Q_7 and Q_8 are independently selected from the group consisting of $N(R)_3^+$, $N(R)_2$, OR, $O(R)_2^+$, $O(R')$, $N(R')_2$, $NH(R'')$, $S(R)$, $S(R)_2^+$ and $S(R')$; wherein each R substituent on Q_5 , Q_6 , Q_7 or Q_8 is independently selected from H or a methyl group;

5 each R' substituent on Q_5 , Q_6 , Q_7 or Q_8 is as defined above for Q_4 ; and

 each R'' substituent on Q_2 , Q_3 , Q_4 , Q_5 , Q_6 , Q_7 or Q_8 is independently hydrogen or comprises a moiety selected from the group consisting of amino acid residues, polypeptide residues, protein residues, carbohydrate residues and combinations thereof.

10 2. The compound of Claim 1, wherein Q_4 is $N(R')_2$ and both R' substituents on the Q_4 nitrogen atom are represented by formula II or formula III.

 3. The compound of Claim 2, wherein Q_3 is H or OH.

 4. The compound of Claim 1, wherein Q_1 is $N(R)_2$ and wherein both R substituents on the Q_1 nitrogen atom are straight chain alkyl or alkenyl groups

15 having from 8 to 27 carbon atoms.

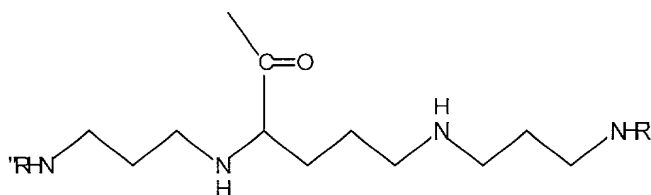
 5. The compound of Claim 4, wherein Q_3 is H or OH.

 6. The compound of Claim 5, wherein Q_4 is $N(R')_2$ wherein both R' substituents on the Q_4 nitrogen atom are represented by formula II wherein Q_5 is OH.

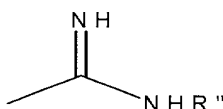
20 7. The compound of Claim 6, wherein Q_6 is NHR'' and wherein the R'' substituent on the Q_6 nitrogen atom comprises:

 a peptide residue;

 a spermine residue represented by the formula



or a moiety represented by the formula:



5 8. The compound of Claim 7, wherein the R'' substituent on the Q₆ nitrogen atom comprises a peptide-protein residue.

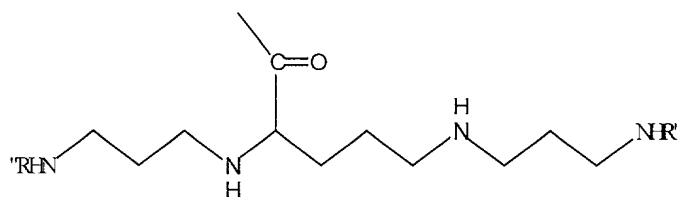
9. The compound of Claim 1, wherein Q₁ is N(R)₃⁺, Q₃ is OH, and Q₄ is N(R')₂ wherein both R' substituents on the Q₄ nitrogen atom are moieties represented by formula II wherein Q₅ is OH and Q₆ is N(CH₃)₃⁺.

10 10. The compound of Claim 9, wherein two of the R substituents on the Q₁ nitrogen atom are straight chain alkyl groups having from 8 to 27 carbon atoms and wherein the third R substituent on the Q₁ nitrogen atom is a methyl group.

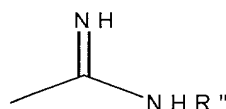
11. The compound of Claim 4, wherein Q₄ is NHR'' and Q₃ is OR' wherein the R' substituent on the Q₃ oxygen atom is represented by formula II wherein Q₅ is
15 OH and Q₆ is NHR'.

12. The compound of Claim 11, wherein the R' substituent on the Q₆ nitrogen atom comprises:

a spermine residue represented by the formula



5 or a moiety represented by the formula:



10 13. The compound of Claim 3, wherein Q_4 is $N(R')_2$ wherein both R' substituents on the Q_4 nitrogen atom are moieties represented by formula II wherein Q_5 is OH and Q_6 is NHR'' .

14. The compound of Claim 4, wherein: Q_3 is OH; Q_4 is NHR'' ; $n = 2$; and each Q_2 is OR' wherein the R' substituent on each Q_2 oxygen atom is a moiety as represented by formula II wherein Q_5 is OH and Q_6 is NHR'' .

15 15. The compound of Claim 4, wherein: $n=0$; Q_3 is OH; Q_4 is $N(R')_2$ wherein both R' substituents on the Q_4 nitrogen atom are moieties as represented by formula II wherein Q_5 is OR' and Q_6 is NHR'' ; and wherein the R' substituent on each Q_5 oxygen atom is a moiety represented by formula II wherein Q_5 is OH and Q_6 is NHR'' .

20 16. The compound of Claim 1, wherein Q_3 is OR' , NHR' or SR' and Q_4 is $N(R')_2$ wherein one R' moiety on the Q_4 nitrogen atom is a moiety of formula II wherein Q_6 is OR' and the remaining R' moiety on the Q_4 nitrogen atom is represented by the moiety of formula III wherein Q_8 is OR' .

17. The compound of Claim 16, wherein $n = 0$, Q_1 is $-N(R)_2$ and Q_3 is OR' .
18. The compound of Claim 1, wherein Q_3 is $-OR'$, $NH(R')$ or $S(R')$ and Q_4 is $N(R')_2$ wherein both R' substituents on Q_4 are represented by the moiety of formula II wherein Q_5 is OR' .
- 5 19. The compound of Claim 18, wherein Q_3 is OR' and wherein Q_2 is OR' , SR' , or $N(R')_2$.
20. The compound of Claim 1, wherein: Q_3 is OR' , NHR' or SR' ; and wherein Q_4 is $N(R')_2$ wherein one of the R' substituents on the Q_4 nitrogen atom is represented by the moiety of formula II wherein Q_5 is OR' , and the remaining R' substituent on the Q_4 nitrogen atom is represented by the moiety of formula III
10 wherein Q_8 is OR' .
21. The compound of Claim 20, wherein Q_2 and Q_3 are OR' .
22. The compound of Claim 20, wherein the R' substituent on the Q_2 oxygen atom is represented by formula II wherein Q_5 is OH and Q_6 is $N(R')_2$ and
15 wherein both R' substituents on the Q_6 nitrogen atom are represented by formula II wherein Q_5 is OR' .
23. A lipid aggregate comprising one or more molecules of a compound as set forth in Claim 1.
24. The lipid aggregate of Claim 23, further comprising at least one lipid
20 aggregate forming compound.
25. A kit comprising a compound as set forth in Claim 1 and at least one additional component selected from the group consisting of one or more cells, a

cell culture media, a nucleic acid, a transfection enhancer and combinations thereof.

26. The kit of Claim 25, wherein the kit comprises a transfection enhancer selected from the group consisting biodegradable polymers, cell membrane
5 disruption peptides, cell surface receptor ligands, and DNA condensing proteins.

27. The kit of Claim 26, wherein the transfection enhancer is a biodegradable polymer selected from the group consisting of natural polymers, modified natural polymers, synthetic polymers, carbohydrates, and polysaccharides.

10 28. The kit of Claim 27, wherein the transfection enhancer is a polysaccharide selected from the group consisting of amylopectin, hemi-cellulose, hyaluronic acid, amylose, dextran, chitin, cellulose, heparin and keratan sulfate.

29. The kit of Claim 26, wherein the transfection enhancer is a DNA condensing protein selected from the group consisting of histones and protamines.

15 30. The kit of Claim 25, wherein the kit comprises:
a cell comprising one or more enzymes involved in DNA expression; and
an inhibitor which inhibits at least one of the one or more enzymes
involved in DNA expression.

31. The kit of Claim 25, wherein the kit comprises:
20 a cell comprising one or more surface receptors; and
a ligand which interacts with at least one of the one or more surface
receptors.

32. The kit of Claim 31, wherein the ligand is a polypeptide or a carbohydrate.

33. A method for introducing a substance into cells comprising:
forming a liposome from a compound as set forth in Claim 1;
5 contacting the liposome with the substance to form a complex between the liposome and the substance; and
incubating the complex with one or more cells.

34. The method of Claim 33, wherein the substance is selected from the group consisting of a nucleic acid, an oligonucleotide and a carbohydrate.

10 35. The method of Claim 33, wherein the substance is a polypeptide or a protein.

36. The method of Claim 33, wherein the substance is a biologically active substance.